

ABSTRACT

An adaptive optical lens device, system and method of using the same is
5 composed of at least two planar substrates and at least one homogeneous nematic liquid
crystal (LC) layer. One planar substrate has a spherical or annular ring-shaped Fresnel
grooved transparent electrode within it, the other has a transparent electrode coated on its
inner surface. The thickness of the LC layer is uniform. When a voltage is applied
across the LC layer, a centro-symmetrical gradient distribution of refractive index within
10 LC layer will occur. Therefore, the LC layer causes light to focus. By controlling the
applied voltage, the focal length of the lens is continuously tunable.